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a lead weight suspended between two mica discs cutting across a small air-tight box. If the instrument is placed on the ground and any one is pounding or digging in the vicinity, energy is transmitted as wave motion to the earth, and the earth-waves shake the geophone case. The lead weight, on account of its mass and because it is suspended between the mica remains comparatively motionless. There then is produced a relative motion between the instrument case and the lead weight. The result is that a compression and rarefaction of the air in the instrument takes place. Since the rubber tube leading to the stethoscopic ear piece is connected with this space in the geophone, this rarefaction and compression is carried to the ear drum. Usually two instruments are used, one for each ear.

When the two instruments are used, it has been found that the sound is apparently louder from the instrument nearer the source of the sound. It is evident then that by moving the instruments properly a point can be found when the sound will be of the same apparent intensity in both ears. The direction of the sound is then on a perpendicular to the line connecting the centers of the two instruments either in front of or behind the observer. Further observation will show which side. Direction is quite accurately determined in this way. The sound is not actually louder in one ear than in the other, but the ear is capable of distinguishing the difference in time at which the sound arrives in the two instruments.

During the period of the war, engineers of the Mining Division of the Bureau of Mines were engaged in determining the distance that different mining machines could be heard through the clay, shale, coal and the mine cover. Measurements were made also of the energy required in blows that they be heard definite distances through clay, shale and coal, as well as the distances at which the shock waves resulting from the discharge of various explosives could be heard. A brief investigation of the factors influencing the transfer of energy from a mining tool to the clay and coal was also made in order that recommendations could be made as to the type of mining machine which could be used to accomplish the most work with the least noise.

SCIENTIFIC ITEMS

We record with regret the death of Emil Fischer, professor of chemistry in the University of Berlin, and Adrian J. Brown, professor of the fermentation industries at the University of Birmingham.

Dr. John Campbell Merriam, professor of paleontology and historical geology in the University of California, who has been acting chairman of the National Council of Research, was elected president of the Pacific Division of the American Association for the Advancement of Science at the Pasadena meeting.—On the occasion of the seventieth birthday of Sir William Osler, regius professor at Oxford University and previously professor in the Johns Hopkins University, which occurred on July 12, he was presented with a collection of essays contributed by about one hundred of his pupils and colleagues.

George Eastman, head of the Eastman Kodak Company, has given the sum of $3,500,000 for the establishment of a school of music in connection with the University of Rochester. The school will aim to aid the development of an appreciation of the highest type of motion pictures as an ally of the highest type of music.